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Cross-sectional Analysis of Short Sale of NYSE's Blue Chips

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Abstract

The aim of the paper is to analyse the determinants of short sale activity of blue chips on NYSE in the period 2000 – 2014. In the paper the fixed effect panel regression model is applied. The determinants of short selling activity are chosen according to previous literature review. The investigate period was divided into three separate sub periods that correspond with different economics conditions in the period 2000 – 2014. Analysed variables represent company fundamentals and market specifics characteristics. The impact of analysed variables on short sale level is long-term stable and constants.

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Keywords: S&P 500; short sale; panel regression; fixed effect

1. Introduction

The short sale is a market mechanism that allows to capitalize over pricing of securities or to participate in a decreasing market. In U.S. the short sale was making more difficult because of the adoption of so called uptick rule that went into effect in 1938 and was removed in 2007. In 2009, the reintroduction of the uptick rule was widely debated, and proposals for a form of its reintroduction by the SEC. A modified form of the rule was adopted in 2010. The aim of this paper is to analyze short sale determinants in the period 2000 – 2014 and particular sub periods. The level of short sale is measured by short sale interest. The list of determinants is represented by firm fundamentals and market specific characteristics.

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1.1. Data and methodology

The cross-sectional panel regression is carried out for 502 stock representing Standard and Poor 500 Index in the time period 2000 – 2014. The data was gathered from the Bloomberg and the analysis is based on 90.360 monthly observations. The development of short selling activity measures by short interest ratio (statistics mean) is documented in the Figure 1. The full dataset is spitted into three sub periods representing different economics conditions for the comparison of short sale determinants. Particular sub periods are following:

- Sub period 2000 – 2006 or pre crisis period
- Sub period 2007 – 2009 or crisis period
- Sub period 2010 – 2014 or post crisis period or period or the recovery

The studies focused on short sale determinants are following. Brent et al. (1990) analyze short interest base on tax, arbitrage and speculative reasons. They found out that stocks with, among others, higher betas are more shorted. Dechow et al. (2001) focused on relation between company fundamentals and short sale levels. They approve that short-sellers position themselves in the stock of firms with low fundamentals, and then cover their positions as the ratios mean-revert. They also pointed the importance of transaction costs out. Angel et al. (2003) analyzed short sale on Nasdaq. They main findings are following: short selling is more common among stocks with high returns than stocks with weaker performance and actively traded stocks experience more short sales than stocks of limited trading volume. Kot (2007) tests explanation of short sale on the NYSE and NASDAQ in the period 1988 – 2002, he founds that short selling activity is positively related to arbitrage opportunity and hedging and negatively to previous short sale activity. List of short sale determinants with investor motivation for short sale is summarized in the Table 1.

Table 1. List of short sale determinants based on literature reviews.

Variable	Expected impact on short sale level	Motivation of investors
Average market price	Unknown	Transaction costs
Average Coefficient of variation	Unknown	Speculation
Beta coefficient	Positive	Arbitrage or hedging
Monthly rate of return	Unknown	Speculation
Existence of a convertible security	Positive	Arbitrage or hedging
Existence of an option	Positive/ Negative	Arbitrage or hedging/ Speculation
Cumulative year rate of return	Negative	Trend
Book-to-market ratio	Negative	Overpricing
Merges of acquisition	Positive	Arbitrage or hedging
Variance of rate of return	Positive	Trend
Company age	Negative	Trend
Market capitalization	Positive	Transaction costs
Number of institutional investors	Positive	Transaction costs
Share of institutional holdings	Positive	Transaction costs
Liquidity	Positive	Transaction costs
Member of in S&P 500	Positive	Transaction costs

1.2. Methodology

In the paper the cross-sectional panel regression is applied.

We assume the balanced panel that each individual variable is observed in all time periods *t*. There are two basic models for the analysis of panel data, the fixed effect model and the random effect model. For the fixed effects model, the individual-specific effect is a random variable that is allowed to be correlated with the explanatory variables, in the random effects model is random variable uncorrelated with explanatory variables. To decide between fixed or random effect the Hausman test was run where null hypothesis is that the preferred model is random vs. alternative the fixed effects.

As a dependent variable is chosen short interest ratio the explanatory variables are represented by a particular short sale determinants. Analyzed determinants of short sale are divided into two groups. Market specifics determinants such as market capitalization, volume of trade, rate of return and rating. And company fundamentals represented by Price-to-Book Value, Price-to Earnings, Price-to-Sales, Price-to-Free-Cash Flow and Dividend yield. The characteristics of the determinants are demonstrated in the Table 2.

Table 2. Variable characteristics.

Variable	Definition	Expected effect
Short interest ratio	Average number of days for closing all open short sale positions	-
Market Capitalization (logarithm)	Proxy for company size. Dollar market value of all shares outstanding.	Positive/ Negative
Volume of trade (logarithm)	The total quantity of shares bought and sold during a particular period.	Positive/ Negative
Price-to-Book-Value	A ratio used to compare a stock's market value to its book value. Low value might indicate undervaluation of a stock.	Negative
Price-to-Earnings	A valuation ratio of a company's current share price compared to its per-share earnings.	Negative
Price-to-Sales	A valuation ratio that compares a company’s stock price to its revenues.	
Price-to-Free-Cash-Flow	A valuation metric that compares a company's market price to its level of annual free cash flow.	Negative
Monthly rate of return	The gain or loss on an investment over a specified period	Negative
Rating	Selling or buying recommendation, states from 1 (strong sell) – 5 (strong buy)	Negative
Dividend yield	A financial ratio that shows how much a company pays out in dividends each year relative to its share price	Negative

1.3. Results

In the Table 3 are demonstrated results of fixed effect panel regression model for the full period and for particular sub periods. The statistics significance of determinants is long-term stable and also the impact of the determinants in the level of short interest measures with short interest period is constant.

Table 3. Panel Regression Results.

Variable	Full Period	2000 - 2006	2007- 2009	2010 - 2014
Constant	25,09236	26,111377	25,44916	47,59017
Beta coefficient	0,049270***	0,170302***	0,119416***	0,134999***
Market Capitalization (logarithm)	-0,661230***	-0,240451***	0,215401***	-1,186123***
Volume of trade (logarithm)	-0,888538***	-1,138021***	-1,405484***	-1,971229***
Price-to-Book-Value	0,00002	-0,000393	0,000996**	0,000002
Price-to-Earnings	0,000148**	-0,000430***	0,00001	0,000124
Price-to-Sales	0,021781***	-0,000986	0,061460***	0,059203***
Price-to-Free-Cash-Flow	-0,000008	-0,000008	-0,000122**	-0,00002
Rate of return	0,688757***	0,030309	0,946726***	0,765977***
Rating	0,0000003	-0,0000004	0,000002	0,000002**
Dividend yield	-0,016195***	-0,147925***	-0,002078	0,009226**
R^2	0,352435	0,442605	0,563515	0,584194

*, ** and *** indicate significance at the 10%, 5% and 1% level, respectively

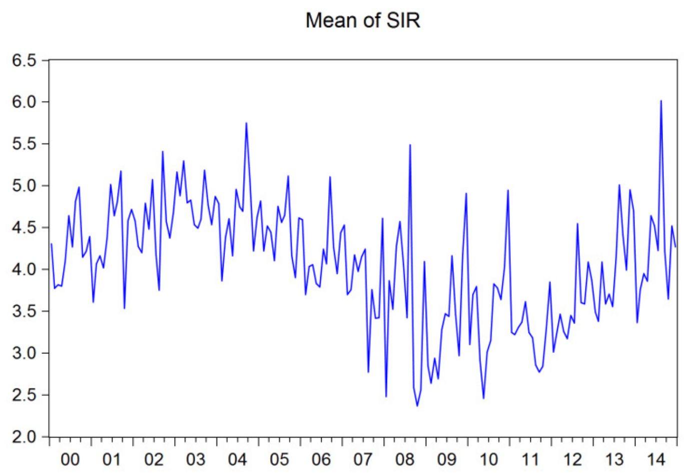

Fig. 1 Level of SIR(mean) in the period 2000 - 2014.

Beta coefficient is positive and statistically significant in all periods. The positive impact of beta on the level of short sale is consistent with the previous studies. Market capitalization is also statistically significant in all analysed period. Only in the sub period 2007 - 2009 is the impact of this variable positive. The negative impact of market capitalization corresponds with author expectation. The probability of undervaluation is for large companies less likely than for small ones. The positive role of market capitalization in the crisis period might indicate the market correction of a bubble established in the period 2000 - 2006. The last market specific variable of volume of trade negatively influences the level of short sale. It assumes that less tradable stocks are more likely overpriced than more liquid securities. The impact of company fundamental variables is not such as explicit. But all fundamentals are statistically significant in a particular period. Excepting Price-to-Free-Cash Flow and Dividend yield is the impact of these variable on short interest level positive. These findings are against the expectation.

2. Conclusion

The aim of the paper was to analyze short sale determinants in the period 2000 – 2014 on NYSE. The fixed effect panel regression model was applied. The analyzed variables were dividend in two categories – company fundamentals and market specific characteristics. The results indicate that the factors influencing short sale level are long-term stable.

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